DRAFT
EXPLANATION OF SIGNIFICANT DIFFERENCES
CONTINENTAL STEEL SUPERFUND SITE
FINAL RECORD OF DECISION, SEPTEMBER 1998
AS AMENDED SEPTEMBER 2003

Indiana Department of Environmental Management
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CONTENTS

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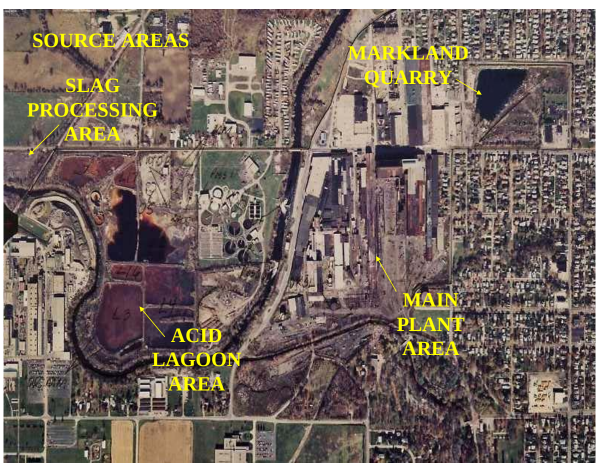
I. Introduction

This fact sheet provides background and information about proposed changes to the Continental Steel Remedial Action including elimination of the Corrective Action Management Unit (CAMU), which was to be an on-site landfill.

Site Name and Location

The Continental Steel Superfund Site (**CSSS**) is located on West Markland Avenue in the City of Kokomo, Township 23 North, Range 3 East, and Township 24 North, Range 3 East, Howard County, Indiana. The site is approximately 183 acres in size and consists of an abandoned steel manufacturing facility (Main Plant), acid treatment lagoons (Lagoon Area), a former waste disposal area (Markland Avenue Quarry), and a former slag processing area (Slag Processing Area).

The site is in a mixed residential, commercial, and industrial area and mainly zoned for general use. The closest homes are within 100 feet east of the site, near the property line along South Leeds Street, and south of the Main Plant across Kokomo Creek. Highland Park, a public recreation area, lies south of the Main Plant just across Kokomo Creek.



This aerial photo of CSSS shows the locations of the four source areas.

Geologic Features

CSSS is in the Upper Wabash River basin. Kokomo and Wildcat Creeks flow westward through the site to the Wabash River. The confluence of Wildcat Creek and Kokomo Creeks is southwest of the Main Plant.

Howard County is on the Tipton Till Plain, a nearly flat glacial till plain that slopes gently to the west. Glacial drift deposits underlying the site are generally less than 20 feet thick. Paleozoic bedrock underlies the glacial drift deposits. Bedrock structure is dominated by the Cincinnati Arch in this area of the state. The site is located near the axis of the Cincinnati Arch, although bedrock units in the vicinity of the site dip slightly southwest from the axis of the arch.

Lead And Support Agencies

The Indiana Department of Environmental Management (**IDEM**) is the lead agency responsible for conducting the Remedial Action (**RA**) at the site under a cooperative agreement with the United States Environmental Protection Agency (**EPA**) in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (**CERCLA**), commonly known as Superfund. **EPA** is the support agency. To maximize the resources applied to the project, **IDEM** and **EPA** have agreed that **EPA** will be the lead agency for the Wildcat and Kokomo Creeks Sediment Removal and the Contaminated Solids Consolidation at the Lagoon area.

Citation Of **CERCLA** Section 117

CERCLA Section 117(b) requires that:

Notice of the final remedial action plan (**ROD**) adopted shall be published and the plan shall be made available to the public before commencement of any remedial action. Such final plan shall be accompanied by a discussion of any significant changes (and the reasons for such changes) in the proposed plan and a response to each of the significant comments, criticisms, and new data submitted in written or oral presentations (Responsiveness Summary).

CERCLA 117(c) and the National Contingency Plan (**NCP**) 300.435(c)(2)(i), require that if any remedial action taken differs in any significant respect from the final plan, the President or the State shall publish an explanation of the significant differences and the reasons such changes were made.

Circumstances that Gave Rise to the Need for Explanation of Significant Differences (**ESD**)

As a result of information collected during the remedial design and views expressed by the community (see Section II, page 4 of this **ESD**), **IDEM** has determined that it is appropriate to make significant changes to the remedy that was proposed in 1997 and incorporated into the 1998 Final Record of Decision (**ROD**) as amended in 2003. The remedial action objectives that were presented in the 1998 **ROD** have not changed.

The **ESD** Will Become Part of the Administrative Record File

This **ESD** will become part of the administrative record file for the **CSSS**. The Administrative Record (**AR**) is available for viewing at the Kokomo/Howard County Public Library, Genealogy Section, 220 North Union Street, Kokomo; and from 8:15 a.m. until 4:45 p.m. at the **IDEM** Central File Room on the 12th Floor, Indiana Government Center North Building, 100 North Senate, Indianapolis. The Five Year Review was placed in the **AR** in 2002. The **AR** was recently updated to include the Basis of Design documents for each area. These documents contain data collected during the 2001 pre-design investigation.

II. Description of Significant Differences and Basis for those Differences

Acid Lagoon Area 1998 Remedy

- **RCRA** Surface Impoundment Closure
- **Excavate Contaminated Solids and Consolidate On-Site in CAMU**
- **Collect and Contain Shallow Groundwater with Expanded Interception Trench System and Dispose Off-Site**
- Deed & Groundwater Use Restrictions

WHAT'S DIFFERENT: Solids will not be consolidated on-site, Soil cover will be placed over closed lagoons and surrounding area. Shallow groundwater will be extracted with wells.

Wildcat and Kokomo Creeks 1998 Remedy

- **Excavate PCB Solids along Kokomo Creek and Dispose On-Site in CAMU**
- Install Common Soil Cover
- Collect & Contain Shallow Groundwater and Dispose Off-Site
- **Elevated VOC Solids Removal and On-Site Disposal**
- Deed and Groundwater Use Restrictions

WHAT'S DIFFERENT: Creek sediments(PCB solids) will be disposed off-site at an existing permitted facility.

Markland Quarry 1998 Remedy

- Cover Contaminated Solids with Common Soil
- **Dispose of Quarry Sediment in Lagoon Area CAMU**
- Contain & Collect Shallow Groundwater & Dispose at **WWTP**
- Excavate Contaminated Sediment from Quarry Pond
- Backfill Quarry Pond with alternative fill material
- Deed and Groundwater Use Restrictions

WHAT'S DIFFERENT: Quarry sediment will be disposed off-site at an existing permitted facility.

The basis for the remedy changes listed above, is that Resource Conservation and Recovery Act (**RCRA**) Hazardous and Toxic Substances Control Act (**TSCA)** waste from other areas of the site will not be disposed in the Lagoon Area.

Community Concerns. During and after the Five Year Review which was completed on September 4, 2002, **IDEM** received comments from the public objecting to the **CAMU**. **IDEM** held a public availability session on June 13, 2002, and accepted public comments as part of the Five Year Review. Oral comments and written comments objecting to the landfill were received. **IDEM** addressed the Kokomo City Council on October 29, 2002, where members expressed their concerns. **IDEM** addressed similar concerns that were expressed by Indiana's Environmental Quality Service Council on October 4, 2002. Elected representatives, including former State Representative Ron Herrel and Mayor Matt McKillip, expressed their objections directly to IDEM and to the local media. Those concerns and information collected during the remedial design contributed to the proposed remedy change.

Remedial Design Information. The creek sediment and the quarry sediment that would have comprised about 2% of the **CAMU** contents are expected to be RCRA Hazardous (due to the level of **VOCs**) or **TSCA** wastes (containing over 50 parts per million [**ppm] PCBs**). Due to the hazardous quality of these wastes, the **CAMU** needed to be constructed to meet **RCRA** Subtitle C and **TSCA** requirements. The remainder of the waste that would have been consolidated into the **CAMU** consists of soil, sludge and debris from the lagoons and drying beds and other contaminated soil in the 56-acre acid lagoon area. Although this material was heavily contaminated, primarily with heavy metals, it was determined not to be listed or characteristic hazardous waste under **RCRA**. The Baseline Risk Assessment completed in 1997 concluded that the contaminated material presents a potential risk to human health that is above the **EPA's** acceptable excess cancer risk range of 10^{-4} to 10^{-7}, and above the **EPA's** acceptable non-cancer risk index of 1.

Groundwater data collected during the Remedial Investigation (**RI**) and the remedial design investigation indicate that this waste does not leach contaminants above Maximum Contaminant Levels (**MCLs**) into the groundwater. This is probably attributable to the fact that the sludge in the polishing lagoons and drying beds had been processed (mixed with lime) through the on site wastewater treatment plant when the facility was operating. **IDEM's** interim closure of the primary acid storage lagoons, performed in 1989, addressed the stored acid and untreated sludge. The primary acid storage lagoons had an extremely low pH, and the sludge at the base of these lagoons was untreated. The mixture of the sludge with lime likely reduced the leachability of the metal components and thus the mobility of these contaminants. As a result of the interim closure, the pH of the primary acid lagoon contents was raised and those lagoon beds now contain only treated sludge.

There were several reasons to consolidate this waste:

1. To minimize the amount of land used to contain contaminated material;

2. The solidified sludge could serve as a bottom liner of the **CAMU** where hazardous and **TSCA** wastes would be contained; and
3. To provide compensatory flood water storage since the **CAMU** would be constructed in the flood plain.

Based on the information above, these wastes may be stabilized as needed, contained and covered in place in accordance with **RCRA** without construction of a landfill.

> *(**See Figures 4-8.** These figures were originally published in the Technical Memorandum entitled <u>Continental Steel Superfund Site Contract 5 – Groundwater, Groundwater Flow and Quality Conditions</u>, prepared for **EPA** by CH2M HILL on February 7, 2003. The entire memo has been placed in the Administrative Record and is available for viewing at the Public Information Repositories [see Section IX of this ESD for locations]. Under current conditions, prior to **RCRA** closure of the lagoons, the only contaminant detected above **MCLs** in the Lagoon Area upper groundwater during the Remedial Design was Manganese. The **MCL** for Manganese is a secondary standard that may effect the taste or smell of drinking water).*

Surface impoundment closure that meets the requirements of **RCRA** will be performed as planned, however the lagoon contents will not be solidified to provide the base for a **CAMU**. The lagoons will not be consolidated, so the profile of the land will be more amenable to beneficial reuse. A cover will be placed over the entire area, similar to that applied at the Main Plant, Markland Quarry and the Slag Area.

The reasons for and expected outcome of this change in the remedy are:

- The change will result in an earlier start to the construction schedule for the creeks. Wildcat and Kokomo Creeks present the greatest potential risk to human health due to the level of Poly Chlorinated Biphenyls (**PCBs**) in the creeks and the inability to effectively control public access. Under the previous on-site disposal approach it would be necessary to spend the first year of remedial action constructing the **CAMU** base. Eliminating on-site disposal allows for work in Wildcat and Kokomo Creeks to be performed first, therefore providing an earlier reduction in risk to human health and the environment.

- The change meets the criteria for long term protectiveness and effectiveness, and reduces the cost of the remedy by approximately $20 million. It should be noted that cost was a major factor in the original choice against off-site disposal. The material in the lagoons and drying beds, while contaminated, is not hazardous or **TSCA** waste and therefore would not need to be transported off-site for disposal. In addition, according to the results of data that was collected in this area, contaminants are not leaching to the groundwater. Off-site disposal was also considered undesirable due to short term risks posed by transportation of roughly 630,000 cubic yards of contaminated material. Closure of the lagoons in place eliminates the need to transport that material. Off-site disposal of the relatively small volume of hazardous and **TSCA** waste (sediment from Wildcat and Kokomo Creeks and from the Markland Avenue Quarry) provides equivalent protection of human health, and significantly less short term risk than originally assumed.

- Off-site disposal of hazardous and **TSCA** material is more acceptable to the community. Members of the community have voiced opposition to the construction of a hazardous waste landfill in Kokomo.

- Land re-use potential in the Acid Lagoon Area would be increased. The **CAMU** provided for by the **ROD** would have virtually eliminated re-use of the 56-acre acid lagoon area. The landfill cap would have required maintenance and protection, and the remaining acreage was by necessity compensatory flood storage area, to comply with the requirements for construction in a flood plain. Future construction would not have been allowable. Since hazardous and **TSCA** material will not be disposed here, there will not be a need to build a landfill with an impermeable cap. **RCRA** closure of the lagoons and drying beds can be achieved without raising the contours above the floodplain levels. Acreage outside the floodplain would not be blocked from future construction.

- The remedy is more implementable with a measured funding scenario. **EPA** funding for this site is likely to be incremental, providing a limited amount of money for each fiscal year. The previous remedy required approximately $40 million in the first year to consolidate contaminated materials and construct the **CAMU**. Construction can therefore begin earlier because these changes reduce the initial construction cost.

- The purpose of the aggressive trench collection system was to collect **VOC**-contaminated groundwater. Data collected during the remedial design did not detect **VOCs** in the lagoon area shallow groundwater above **MCLs**, indicating that the system was not needed.

Main Plant 1998 Remedy

- Excavate **PCB** Solids along Kokomo Creek and Dispose On-Site.
- Install Common Soil Cover
- Collect & Contain Shallow Groundwater and Dispose Off-Site
- **Elevated VOC Solids Removal and On-Site Disposal in CAMU**
- Deed and Groundwater Use Restrictions

WHAT'S DIFFERENT: Elevated VOC solids will be treated in place using Heated Soil Vapor Extraction.

The reasons for and expected outcomes of this change in the remedy are:

- **IDEM** and **EPA** have agreed that remedial action may take place using the State's funds before **EPA** has fully funded the remedial actions. Ten percent (10%) of the cost of the remedial action must be provided by the State. The Main Plant remedial action will be performed by the State prior to the Lagoon Area work to be performed by **EPA**. Therefore the **CAMU** would not be available for disposal of excavated solids from the Main Plant. By disposing of these materials off-site, the work can begin sooner and be completed earlier.
- During the remedial design, **IDEM** and **EPA** determined that Heated Soil Vapor Extraction (**HSVE**) would be more effective and implementable in the **VOC**-contaminated area of the Main Plant. This contamination is near Park Avenue and may extend underneath the road, making excavation difficult and expensive. HSVE is well suited to removal of **VOCs** from soils with a high clay content. HSVE was therefore incorporated into the designs for the Main Plant **VOC**-contaminated soil. The change meets the criteria for reduction of toxicity, mobility and volume through treatment, and does not increase the cost of the remedy. As a result of this change, contaminants will removed as opposed to being contained in a disposal unit on-site. Extracted vapors will be captured and treated to minimize risks to the public.

III. Institutional Controls

Institutional Controls, (**ICs**) are included in the remedy for the Acid Lagoon, Main Plant, Markland Quarry and Slag Processing areas; where contaminated material will be covered or capped in place. **ICs** to restrict groundwater use are included in the remedy where groundwater is contaminated (an area roughly bordered by Courtland Street on the east, Defenbaugh Road on the south, Sycamore Street on the north, and County Road 300 West on the west). **ICs** must be adequate to prevent contact with contaminated media, and must be enforceable. **ICs** will be used to:

- Ensure that current and future property owners are advised of the presence, location and nature of any contaminants that remain on the site;
- limit use of contaminated groundwater;
- prevent contact with contaminated material wherever it is contained and covered in place;
- ensure that future property owners will maintain any covers that were constructed;
- protect future construction workers and land users from exposure to contaminants; and
- prevent future release of contaminants.

ICs are instruments such as administrative and/or legal controls that minimize the potential for human exposure to contamination by limiting land or resource use. Some examples of **ICs** include easements, environmental covenants, well drilling prohibitions, zoning restrictions, and special building permit requirements. They are to be used along with the engineering measures, such as covers or caps.

Zoning restrictions currently limit the use of the Main Plant and Acid Lagoon areas to industrial/commercial. Zoning restrictions alone are not considered adequate, because zoning restrictions do not fulfill all the purposes stated above and may be changed by local government. The Level Five Fish Consumption Advisory for Wildcat Creek is an **IC,** but is not adequate because it is an unenforceable advisory and does not effectively prevent persons from consuming contaminated fish. Other instruments may be used for more effective long term control. Indiana Code [**IC 13-**14-2-6(5)] authorizes **IDEM** to use and enforce an Environmental Restrictive Covenant (**ERC**), defined in IC 11-2-193.5. **ERCs** are commonly used for cleanups in Indiana that are performed under RCRA, Voluntary Remediation and other programs. An **ERC** must:

- Contain a list of prohibited or required land uses;
- Contain a legal description of the real estate and attach maps showing the location of the contamination;
- Identify the contaminants of concern left on the real estate;
- Describe all actions necessary to maintain any engineering controls on the land;
- Contain a statement to allow reasonable access to **IDEM** to enter upon the real estate;
- Contain a statement that the document is to "run with the land" and be binding on successors;
- Be executed by the current property owner placing the restrictive covenant;
- Be notarized;
- Be recorded in the county recorder's office in the county where the land is located;
- Send notice and proof to **IDEM** that the **ERC** was recorded;
- Contain a statement that the **ERC** can be enforced by **IDEM** under **IC 13-**14-2-6(5);
- Describe the terms or procedures for modifying or terminating the restrictions; and
- Set forth a location where the remedial plan can be viewed by the public.

At Continental Steel, cleanup levels were determined based on the reasonably expected future use of each area. The **ERCs** would prohibit residential use of land where the cleanup levels are appropriate for industrial/commercial or recreational. They would prohibit the use of contaminated groundwater for consumption. They may prohibit drilling new wells. They would require the maintenance of any cover that was constructed, or for future construction in contaminated areas would require disposal of excavated soils in a landfill in accordance with waste disposal regulations. For future construction the **ERC** would require certain precautions to protect workers and prevent the release of contamination. If this approach is used, an **ERC** must be in place for each affected parcel of property.

Local ordinances and/or building permits may also be used to restrict land or resource use at the site. **IDEM** and **EPA** may discuss these options with Kokomo and Howard County officials to determine whether they are feasible. Local ordinances would need to meet certain criteria to be considered as an **IC**.

It will be necessary for **IDEM** to inspect the site regularly (quarterly, and then annually at a minimum) and perform long term groundwater monitoring. IDEM will verify that appropriate ICs have been implemented, and determine if they are being complied with. **IDEM** will observe and document any change in land use or disturbance to cover material during those events, and take appropriate action if a problem is identified. **IDEM** will include land use and compliance with ordinances or **ERCs** in each Five-Year Remedy Review.

IV. Summary of Site History, Contamination Problems, and Selected Remedy

Continental Steel Corporation was founded as the Kokomo Fence Machine Company in 1896. In 1899, the Kokomo Fence Machine Company was consolidated with other interests to form the Kokomo Nail & Wire Company. In 1900, the company was reorganized under the name of the Kokomo Steel & Wire Company. In 1927, the Kokomo Steel & Wire Company merged with two other steel companies to form the Continental Steel Corporation. By 1947, the other two steel companies were divested and the Continental Steel Corporation facilities were centered in Kokomo.

In 1969, New York-based Penn-Dixie Industries, Inc. acquired the Continental Steel Corporation and officially dropped the Continental Steel name for the Kokomo facility in 1974. Penn-Dixie Industries, Inc. filed for Chapter 11 reorganization bankruptcy in 1980, and emerged in 1982 as the reorganized Continental Steel Corporation. The main offices were moved to Kokomo. Continental Steel Corporation filed for Chapter 11 bankruptcy in 1985, and closed in February 1986 when the bankruptcy filing was converted to Chapter 7 liquidation. The Main Plant has a covenant on the deed that restricts development to industrial use only.

The plant produced nails, wire, and wire fence from scrap metal. Operations included reheating, casting, rolling, drawing, pickling, annealing, hot-dip galvanizing, tinning, and oil tempering. The operations included the use, handling, storage and disposal of hazardous materials.

The site was divided into the following six areas:
Site-Wide Groundwater;
Acid Lagoon (Lagoon) Area;
Kokomo and Wildcat Creeks;
Markland Avenue Quarry;
Main Plant; and
Slag Processing Area.

The Lagoon Area was proposed for the National Priorities List (**NPL**) on June 24, 1988. The site was placed on the **NPL** in March 1989. The Markland Avenue Quarry and the Main Plant were added in May 1990.

In 1989 IDEM initiated an Interim **RCRA** Closure of the lagoons. Waste sulfuric acid (known as “pickle liquor”) was pumped from the storage lagoons, and treated to neutralize the acid. The stabilized sludge was placed back into the lagoon beds and the liquid was pumped to the Kokomo Waste Water Treatment Plant (**WWTP**).

EPA initiated a Removal Action in the Markland Quarry Area on February 2, l990. About 800 cubic yards of soil, about 200 drums found to contain liquid and a few hundred empty drums were disposed of off-site. **EPA** performed an underwater investigation of the quarry pond and removed and disposed of about 1,150 drums and three 4,000-gallon storage tanks. This action began in June l99l and was completed in August l99l.

On March l3, l990, the **EPA** conducted an assessment of the Main Plant, and found approximately 700 drums; 55 tanks ranging in size from 5,000 to 2 million gallons; and 33 vats; all containing unknown materials. **EPA** arranged for the disposal of about 1000 empty, crushed drums, about 200 drums of product material, about 50 containers of lead cadmium batteries, and about 5,000 gallons of base-neutral liquids. Reports of waste generation and storage at Continental Steel indicated that about 66 tons of Trichloroethylene (**TCE**) sludge were generated annually. Waste **TCE** sludge was stored on-site, and disposed of by others on a periodic basis. The facility was in violation, at least once, for improper storage of this waste. **PCB** transformers and waste were stored in drums in the same building.

The first phase of the 1993 **RI** generated information about the nature and extent of contamination. Phase II of the **RI**, conducted in 1995, addressed Markland Avenue Quarry, the Main Plant, and the Slag Processing Area; and data gaps for the site-wide groundwater, the Lagoon Area, and the Wildcat and Kokomo Creeks.

In June 1996 the Indiana State Department of Health (**ISDH**) performed radiation surveys in the Slag Processing Area, Lagoon Area, and the former laboratory area in the Main Plant. They detected no evidence of gross radiological contamination in the areas surveyed.

A Feasibility Study (**FS**) was completed in 1997. A Proposed Plan was presented to the community in 1997, and the Final **ROD**, <u>Source Control and Management of Migration</u>, was signed by **IDEM** and **EPA** on September 30, 1998. The **ROD** was amended September 26, 2003.

V. Historical Information and RI/FS Results for Each Area.

Site-Wide Groundwater

Site Conditions. Most Kokomo residents rely on public water supplies provided by Indiana-American Water Company, although there are private wells. Indiana-American Water Company draws its water from a reservoir northeast of Kokomo, more than five miles upgradient from **CSSS**. The nearest downgradient public drinking water well is nearly fifteen miles from the site. Three non-community public water supply wells near **CSSS** were sampled during the **RI** and Contaminants of Potential Concern (**COPCs**) were not detected.

There are three aquifers under the site differentiated by water-bearing capacity. They are referred to as the upper, intermediate, and lower aquifers and further separated into:

(1) Source area groundwater (underlying contaminant source areas); and
(2) Site-wide (not underlying contaminant source areas). This includes a large area of affected groundwater from all aquifers that appears to have received contaminants from the Main Plant, Markland Avenue Quarry, the Lagoon Area and/or other areas related to the site, and disposal of hazardous materials.

Source Areas. In 1984-1986, **IDEM** identified chromium, cadmium, lead and iron in groundwater in the Lagoon Area. Investigation of the Markland Avenue Quarry and the Main Plant confirmed groundwater contamination attributable to Continental Steel.

Site Wide Groundwater. Groundwater flow is generally to the west. Flow within each aquifer may vary according to local and regional influences, particularly in the upper aquifer. The upper aquifer is influenced by Wildcat and Kokomo Creeks. The intermediate and lower aquifers are largely influenced by flow through fractures in the bedrock. Groundwater flow in the intermediate aquifer on the eastern two-thirds of the site is due west. Groundwater pumping at the Martin Marietta Quarry causes hydraulic influence that is first observed in the vicinity of the Slag Processing Area.

A groundwater model was used to predict interactions between groundwater and surface water, between the three aquifers, and between localized and regional influences from pumping wells. The following conclusions were developed:

- Contaminant transport in the intermediate and lower aquifers is controlled by Martin Marietta Quarry pumping and upper aquifer discharge to Wildcat and Kokomo Creeks;

- Groundwater flow pathways follow the westerly course of Wildcat and Kokomo Creeks and do not diverge significantly to the north or south; and

- Capture of contaminated groundwater by wells in a residential subdivision southwest of the site is unlikely whether the quarry pumping is operational or discontinued.

VOCs were the primary contaminants detected in groundwater. Poly Aromatic Hydrocarbons (**PAHs**), **PCBs**, pesticides and metals were detected, but plumes were not identified except for a few metals. Dense Non Aqueous Phased Liquid (**DNAPL**) is present in all three aquifers.

Lagoon Area

Site Conditions. The Lagoon Area covers approximately 56 acres located approximately 0.3 miles west of the Main Plant along the south side of West Markland Avenue. The area is bordered on the south and west by Wildcat Creek, on the north by West Markland Avenue, and on the east by the City of Kokomo **WWTP**. The 50 foot wide bank area along Wildcat Creek is a recreational corridor. The Lagoon Area is within a 100-year floodplain. Immediately west of Wildcat Creek lies the Haynes International Inc. facility and its closed landfill. The Lagoon Area is designated for commercial/ industrial use. Recreational use is limited to the creek corridor.

The area includes five polishing lagoons, two acid (hazardous waste storage) lagoons, and three sludge-drying beds. The lagoons were **RCRA**-permitted surface impoundments for treatment of spent pickle liquor (inorganic acid used to remove impurities from metal surfaces). This area contains approximately 788,000 cubic yards of soil, sludge, slag, and clay.

Aerial photo of the Acid Lagoon Area

A fill area near the entrance that may contain drums and slag material, is contaminated with **VOCs**. Some of the lagoons contain standing water.

Structures include an abandoned wastewater treatment building and clarifiers. There are no ecological receptors on-site. Residential areas immediately border the lagoons.

Spent pickle liquor generated at the Main Plant was piped to the two acid lagoons, then pumped to a neutralization and treatment system. Neutralized pickle liquor and sludge were deposited in one of five polishing lagoons. The liquid was then discharged to Wildcat Creek and the sludge was placed into drying beds.

In 1980, Continental Steel achieved interim status for the facility as a hazardous waste treatment, storage and disposal facility under **RCRA**. Monitoring indicated that groundwater within the aquifer under the lagoons was contaminated with metals and trace concentrations of organic compounds. Sampling indicated that surface water, sediment, and fish in Wildcat Creek had been impacted. During inspections, drums and waste piles of slag were observed.

Phase I **RI** activities included sampling of lagoon surface water, sludge, soils under and adjacent to the lagoons, waste piles, sludge in tanks at the treatment building, and water in the basement of the treatment building. Phase II **RI** activities included groundwater sampling and a soil gas survey in the entrance area to assess **VOCs** in the fill.

Soil and Sludge. The **RI** results indicated elevated levels of metals including arsenic, beryllium, cadmium, lead, manganese, and chromium in the soil and sludge. Iron was identified in the lagoon sludge drying beds and in the upper aquifer. Methylene chloride, **PAHs**, and **PCBs** were reported in soil and sludge from the east central and southwest lagoon areas and in the sludge drying beds. Slag piles contained mostly metals, including elevated levels of arsenic, beryllium, and chromium. Silver was reported in one sample from the polishing lagoons.

Surface Water. Metals including arsenic, cadmium, copper, lead, manganese, nickel, and zinc were detected in surface water from the lagoons.

Groundwater. The soil gas survey at the Lagoon Area entrance indicated several integrated plumes of **VOCs**. The primary **VOCs** identified were cis-1,2-dichloroethene (**DCE**), **TCE**, and vinyl chloride. Soil and soil gas data identified several areas with elevated **VOC** solids. (having a total **VOC** concentration greater than 1 milligram per kilogram [**mg/kg**]).

In the entrance area, groundwater under the Lagoon Area is impacted primarily by **TCE**, cis-1,2-**DCE** and vinyl chloride, and to a lesser extent by iron, manganese, nickel, chromium, and antimony. Metal contamination is likely due to the pH in the acid lagoon ponds (metals mobility increases when exposed to significant changes in pH). **VOC** concentrations are highest in the upper aquifer at the entrance, in the intermediate aquifer within the Lagoon Area, and in the lower aquifer downgradient. **VOC** concentrations appear to be decreasing in the upper aquifer, but relatively constant in the intermediate and lower aquifer. Lower aquifer wells at these locations are the most contaminated, indicating that the plume is migrating downward as it moves downgradient. **DNAPL** was noted at the lagoon area entrance. **DNAPL** movement in the Lagoon Area would be through small cracks and pore spaces in the lagoon sludge or slag and then downward into the fractured bedrock below. These bedrock formations are more highly fractured than in other areas of the site, so **DNAPL** is likely to travel more easily through the intermediate into the lower aquifer. The presence of **DNAPL** in upper aquifer groundwater may lengthen (up to 30 years) the time estimated for groundwater to reach the cleanup goals.

Kokomo and Wildcat Creeks

Site Conditions. Wildcat and Kokomo Creeks extend some 20,000 feet within the CSSS. The creeks are 50 to 100 feet wide, with depths up to four feet. The creeks are designated for recreational use. A recreational corridor extends along most of the banks of the creeks. The two creeks run along the borders of the Main Plant, the Lagoon Area, and the Slag Processing Area. No critical habitat is present within the creeks.

Wildcat and Kokomo Creeks are part of the Upper Wabash River basin. Wildcat Creek joins with the Wabash River in Lafayette, Indiana, nearly 45 miles west of Kokomo. The nearest surface water extraction points for a public drinking water supply are over eight miles up stream and over 40 miles down stream of the site.

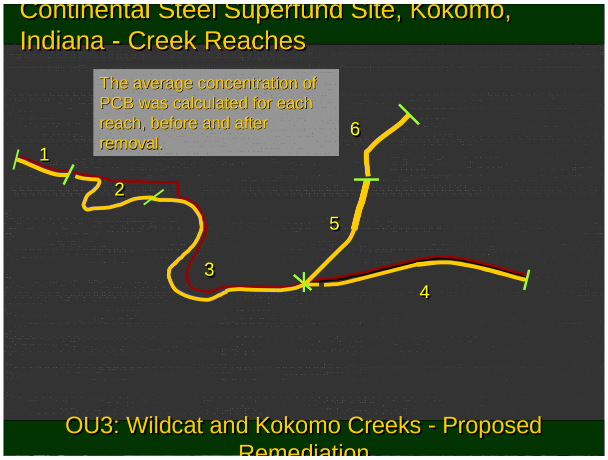
These creeks have been impacted by direct discharge of material, runoff from the source areas, and upstream industrial sources. The creeks received water from the plant's wastewater recycling, treatment and filtration system, neutralized pickle liquor from the Lagoon Area, discharge from site outfalls and storm water runoff from the site in general.

Surface water and sediment sampling was performed during **RI** Phases I and II. The creeks were subdivided into six testing sections or "reaches." Surface water and sediment samples were collected from all six. Background samples were collected upstream within both creeks. Upper aquifer groundwater samples were taken from monitoring wells alongside of the creeks. Groundwater results were compared with sediment and stream water results to evaluate whether the creeks and groundwater are interrelated.

Surface water. The results of surface water sampling indicated elevated levels of lead along all six reaches of the creeks. Copper was detected along Reaches 1 through 5 and zinc was detected along Reach 3. Elevated levels of mercury were detected in samples collected from Reaches 4 and 5. Elevated cobalt concentrations were detected along Reach 6.

Results of groundwater sampling indicate the creeks surface water is not a significant contributor to groundwater contamination. **COPCs** detected in the surface water and sediment are not the same as those detected in groundwater. The groundwater contamination is primarily **VOCs**. The contaminants attributable to Continental Steel in the creek sediment in most areas are **PCB, PAHs** and metals. **VOCs** were detected in Reach 3, adjacent to the buried drum area. The source of this **VOC** contamination will be addressed as part of the Lagoon Area action. Other sources (e.g., lagoons, landfills, and spills) are more significant.

Fish. Fish tissue analyses performed by the **IDEM** Office of Water Quality identified several contaminants (including **PCBs**, mercury, and pesticides) at elevated levels prompting a Level Five fish consumption advisory for the Wildcat Creek in the vicinity of the **CSSS**.



This aerial photo illustrates the six reaches of Wildcat and Kokomo Creeks

Sediment. Sediment samples were compared against background levels and benchmark criteria taken from the Indiana Water Quality Regulations or the Federal chronic ambient water quality criteria. Contaminants were consistently detected above background and/or benchmark criteria in the Wildcat and Kokomo Creeks.

Contaminants Detected Above Criteria in Sediment

VOCs	Reach 3
Semi-volatile organic compounds **(SVOCs)** and PAHs	Reaches 3, 4, 5 and 6
PCB Aroclor-1248, Aroclor-1254, and Aroclor-1260	All six reaches
Aroclor-1016	Reaches 3, 4, 5 and 6
4,4'-DDE, aldrin, and gamma-chlordane	All six reaches at three to 10 (plus) times the criteria
4,4'-DDT, 4,4'-DDD, heptachlor, heptachlor epoxide, endrine aldehyde, dieldrin, gamma-BHC, alpha-chlordane, and endosulfan II	Various Reaches at concentrations greater than 10 times the criteria
Cadmium, chromium, copper, nickel, and zinc	Reaches 1, 3 and 4 at concentrations greater than 10 times criteria
Cadmium, chromium, copper, nickel, and zinc	Reaches 2, 5, and 6 at concentrations less than 10 times criteria
Aluminum, arsenic, barium, iron, lead, silver, thallium, mercury, selenium, manganese, antimony, and vanadium	Various reaches at up to 10 times criteria

Markland Avenue Quarry

Site Conditions. This 23-acre area was formerly a limestone quarry. It is in a residential area bordered by Harrison Street to the north, West Markland Avenue to the south, Courtland Avenue to the east, and Brandon Street to the west. The quarry varied in depth from 70-90 feet and the area now includes a 4-acre pond. The quarry was sold to Continental Steel Corporation in 1947. August 1938 aerial photos show the original quarry as a large pond spanning the entire block, except for the unexcavated southwest corner and southern border, between Courtland Street and Brandon

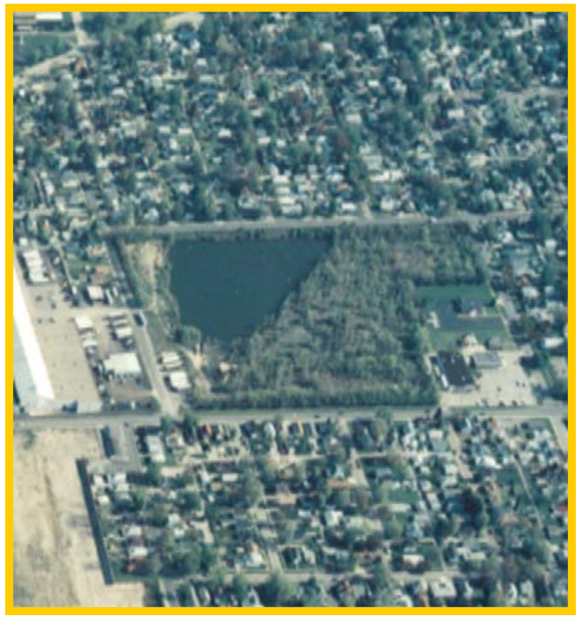
Street. The quarry area is zoned for residential use.

Continental Steel Corporation filled about 3/4 of the quarry with more than 1.2 million cubic yards of waste. Wastes included drums, slag, refractory brick, pig iron, baghouse wastes, and tanks of oil and solvents. According to former employees, drums were emptied onto the ground and disposed of in the quarry pond. Sediment in the pond contains high concentrations of **VOCs** and **DNAPL**. These sediments are four to seven feet thick and are located below 50 feet of water.

Drum and Waste Storage. EPA investigations in 1986 and 1988 revealed approximately 400 (mostly empty) drums, an abandoned storage tank, and slag, ash and refractory brick piles. Samples of drum contents revealed benzene, toluene, tetrachloroethane (**TCA**), and benzoic acid. Phenol, di-n-octylphthalate, **TCE**, and **PCB-** Aroclor l248 were found in soil samples from around the drum storage area.

Surface Water. Sampling of the quarry pond in l987 revealed that the liquid in the pond had a pH of approximately 11.5 for the top samples, and l2.6 for the bottom samples. Low concentrations of copper, zinc, and mercury were present in some samples. Surface water is contaminated with **VOCs** (primarily **TCE**). **DCE** and TCE were present in each of the samples, with higher concentrations of **TCE** detected in the bottom samples. Very low concentrations of other **VOCs** and **SVOCs** were detected in bottom samples, including ethylbenzene, dichloroethane (**DCA)**, toluene, methylene chloride, naphthalene, phenol, and phenanthrene. It is likely **VOC** contaminants are migrating from adjacent fill, **DNAPL** in the sediments, and groundwater.

Sediment. The pond sediment is contaminated with **VOCs, PAHs, PCBs** and metals. **DNAPL** (mostly **TCE**) is present



Aerial photo of the Markland Quarry area

within the pond sediments and is likely migrating into the less fractured bedrock of the intermediate aquifer. Most of the contaminants exceed sediment benchmark screening levels which are based on aquatic toxicity. The sediments are a source of contamination to surface water and groundwater. The contaminants of concern are the **VOCs** because they are highly mobile and migrate easily. **TCE** is the most prevalent, detected at the highest concentrations (>200,000 ug/l). Most of the contaminants detected in the pond sediment exceed sediment benchmark screening levels.

Fill Area. The soil gas survey detected four areas of elevated **VOC** solids, primarily **TCE** and its degradation products. The vertical extent of the contamination could not be defined, because soil gas measurements were limited to 20 feet in depth and fill extends from 50 to 70 feet in depth. The area with the highest contaminant concentration is just north of the abandoned concrete structure in the southwest portion of the site. This area is of concern because of the relatively high concentration of vinyl chloride. The other areas are located along a line from southwest to northeast that parallels an old rail line that crossed the quarry. Based on historical information, it is assumed that the deeper fill material is the same as the top 20 feet. Historic disposal practices indicate that surface drum releases and drum burial may be the sources of the elevated **VOC** solids identified in soil gas results.

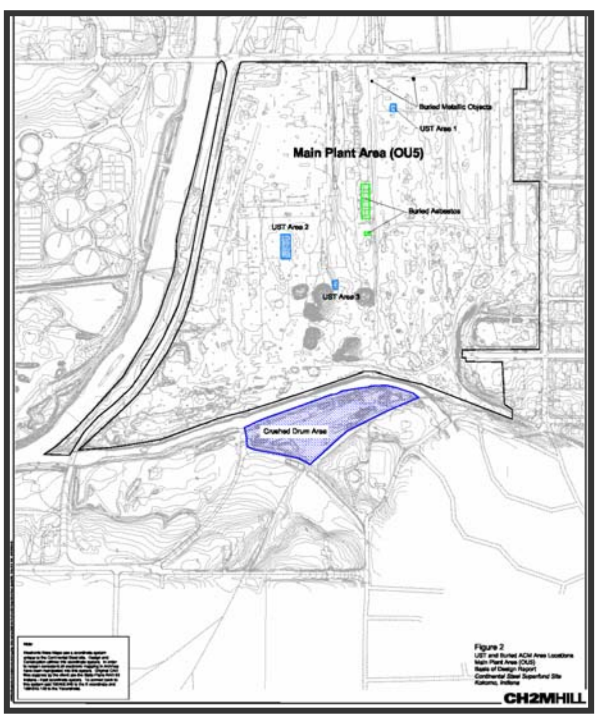
Surface Soils. Surface soils were collected from the quarry fill area and at residential properties surrounding the quarry. Elevated levels of **PAHs, PCBs,** lead, arsenic, and zinc were detected in the surface soils in the quarry fill area. **PAH** and **PCB** contamination appear primarily in the southern half of the fill area. Lead and arsenic are widespread and zinc contamination is sporadic. Residential soil samples downwind from the quarry show isolated detections of contaminants. However, no metals (including lead) were detected in residential soil samples at levels exceeding **IDEM** or **EPA** Action Levels.

Groundwater. The primary contaminants in groundwater are **TCE**, cis-1,2-**DCE**, and vinyl chloride. They are highest in the upper aquifer in the quarry fill area. They are highest in the intermediate aquifer downgradient of the quarry pond. The lower aquifer shows the least groundwater impacts. **VOCs** appear to have migrated downward and to the west side of the site in the intermediate and lower aquifers. Groundwater results indicate that contaminants in the intermediate aquifer are being degraded. This is based on the presence of the **TCE** breakdown compounds (cis-1,2-**DCE** and vinyl chloride).

DNAPL in the quarry pond may migrate in directions different from groundwater flow. Migration would likely be into the intermediate aquifer which is at about the same depth as the quarry sediments.

DNAPL that originates within the quarry fill likely migrates down to the lower portions of the quarry. **DNAPL** may also migrate downward and enter the bedrock fractures below the sediment and on the west and north sides of the quarry pond. **DNAPL** is likely present in fractures in the lower aquifer, having migrated through vertical fractures in the bedrock.

Main Plant



Topographic map of the Main Plant area, showing locations of buried underground storage tanks, asbestos and drums

The Superfund area of the Main Plant consists of 94 acres bordered by West Markland Avenue to the north, Defenbaugh Road and private property to the south, Leeds Street to the east and Wildcat Creek to the west. The Main Plant contained most of the steel operations and is deed restricted for commercial/industrial use. The Main Plant included 127 structures, underground sewers, and utility lines. Industrial operations affected surface soil. There is contaminated soil west of the plant along Wildcat Creek. Early investigations found more than 700 oil- and solvent-filled drums, 55 aboveground and underground storage tanks, and 33 vats.

The tanks and vats held mostly oil and some chlorinated solvents and acids. Twenty-four electrical transformers, 200 capacitors, electric arc furnace dust (baghouse dust), and exposed asbestos were found in the plant.

Phase I RI activities included collection of samples from inside and outside the buildings. Field investigations and previous work by U.S. EPA included sampling of process sewers and soil from stained areas.

Phase II **RI** activities included surface and subsurface soil sampling, groundwater sampling, process sewer sampling, basement water sampling, soil gas sampling, adjacent residential surface soil sampling, and high volume air sampling. Results indicated that the Main Plant contributed to elevated metals in the residential area east of the Main Plant. The residential soil was addressed by a 1998 Removal Action.

Soils. Spills around the site resulted in an impact to soils from **VOCs, SVOCs** and **PAHs, PCBs,** pesticides, and metals. The most significant releases are those involving **VOCs**, which impacted groundwater west of Building 112 (Nail Mill). Other significant spills include:

- Kokomo Creek where **VOCs, PAHs,** and lead were detected above initial screening levels;
- surface spill at the southeast corner of Building 71B (Wire Galvanizing) where **PCBs**, pesticides, lead, and zinc were detected above initial screening levels; and
- area east of Buildings 5 and 42 was observed to have oil saturated soils along with concentrations of **PAHs**, PCBs, and lead above screening levels in soils.

The results of soil gas sampling in an area formerly used as a slag disposal area in the south Main Plant area indicated that **VOCs** were either not detected or detected at very low levels.

Groundwater. Groundwater results indicate few contaminants detected except where reported spills occurred or stained soil is present. Groundwater impact in these areas is likely related to operational practices and spilled chemicals. The primary contaminants in groundwater are **TCE**, cis-1,2-**DCE**, and vinyl chloride. Total **VOCs** were highest in the intermediate aquifer near Wildcat Creek, and in the known spill area on the west boundary of the Main Plant within all three aquifers.

VOC concentrations appear to be decreasing in all three aquifers, except at Wildcat Creek. **TCE** concentrations appear to be decreasing, while cis-1,2-**DCE** and vinyl chloride are increasing. **VOC** concentrations at Wildcat Creek indicate a plume migrating from the Main Plant. The presence of chlorinated **VOCs** indicates that migration of contaminants in the upper aquifer can occur under creek beds.

Slag Processing Area

Site Conditions. Slag processing was conducted to reclaim metals. The Slag Processing Area is located between Wildcat Creek, Shambaugh Run and Markland Avenue. The area contains approximately 208,000 cubic yards of slag. The site includes an open, graded (relatively flat) area with seven piles of slag material, the largest about 45 feet high. The total volume of the slag piles is about 62,000 cubic yards. The southwestern quarter of the area was formerly a quarry (Chaffin Quarry), approximately 30 feet deep, now filled with slag. It is visible to the public and easily accessed. The Wildcat Creek bank to the west has been subjected to runoff and erosion. The surrounding area is generally residential and commercial.

Aerial photo of the Slag Processing area

Slag Piles and Soil. The observation of nine drums combined with drum disposal at other **CSSS** properties indicates that drum burial was a standard practice. Drums observed in this area were in varying states of decay. Most appeared crushed or bent, these may have been empty or near empty at the time of disposal.

Phase II **RI** activities in the Slag Processing Area included surface soil/slag sampling, a soil gas survey, and an evaluation of potential impacts to Wildcat Creek. Based on the **RI**, the slag poses a risk to human health or the environment due to the presence of metals (lead and arsenic). The RI noted a potential pathway for contamination of Wildcat Creek through uncontrolled surface water. Metals identified in the slag and surficial solid media are also contaminants of concern for Wildcat Creek sediment and surface water.

VOCs were not detected in soil gas or surface soil. No **SVOCs** or **PCBs** were detected in surface soil. These results indicate no contamination resulting from surface spills or leaking drums buried near the surface.

Groundwater. No **VOCs** were detected in the upper aquifer, except at the upgradient well. Significant concentrations of **TCE**, cis-1,2-**DCE**, and vinyl chloride were detected in the intermediate aquifer. Cis-1,2-**DCE**, 1,1-**DCA**, and acrylonitrile (150 micrograms per liter [**µg/l**]) were detected in the lower aquifer. This vertical distribution indicates **VOCs** likely originate from upgradient sources rather than from the Slag Processing Area. **VOC** concentrations appear to be decreasing higher within the intermediate aquifer but increasing deeper within the intermediate aquifer. **VOC** concentrations appear to be decreasing in the lower aquifer as well.

VI. Summary of Remedy As Originally Described In ROD

***NOTE**: The tables on the following pages summarize the remedy as it was described in the 1998 **ROD**. **Some components are being changed.** The changes are described in the Section II.*

Site-Wide Groundwater Selected Remedy

Note: Upper aquifers are treated differently than the intermediate and lower aquifers. Upper aquifers underlying the Main Plant, Markland Quarry and the Lagoon Area will be addressed by the remediation for these areas. The groundwater strategy uses several collection systems to:

(1) Contain the plumes within their current boundaries; and
(2) Reduce contaminant levels and attain **MCLs** as rapidly as possible.

Site-Wide Groundwater Selected Remedy

Remedy Component	**Explanation**
Collect Intermediate and Lower Groundwater at Martin Marietta Quarry	Collection of intermediate and lower groundwater at the Martin Marietta Quarry would continue. The quarry pumping rate is currently about 3,200 gallons per minute (**gpm**). Beyond the operational life of the Martin Marietta Quarry, **IDEM** would operate the pumping station until MCLs are achieved. The purpose of collecting intermediate and lower groundwater is to prevent contaminant migration outside its current boundaries.
Dispose of Collected Martin Marietta Quarry Groundwater Off-Site	The intermediate and lower groundwater would be discharged directly to Wildcat Creek under a regulated discharge permit. Groundwater modeling results suggest that discharge concentrations may be below drinking water standards, surface water quality standards, and background quality, so no treatment would be needed.
Collect Upper Groundwater and Dispose Off-site at Kokomo Wastewater Treatment Plant	Upper groundwater would be collected by extraction wells installed along the creeks or within the groundwater contamination plumes. Extracted groundwater would be discharged via underground piping directly to the city sanitary sewer system for treatment at the Kokomo Wastewater Treatment Plant (**WWTP**). *Upper groundwater is covered in more detail within each of the source control areas.*
Monitored Natural Attenuation	Intermediate and lower groundwater would be allowed to naturally attenuate. Natural physical, chemical and biological processes act to degrade the contaminants. Groundwater would be monitored quarterly for two years, semi-annually for the next two years, and annually thereafter until **MCLs** are attained. Additional wells would be installed.
Technical Impracticability (**TI**) Waiver Invoked	A Technical Impracticability (**TI**) waiver was granted pursuant to 121(d)(4) of **CERCLA** from the **EPA TI** Waiver Committee; because groundwater fate and transportation modeling results indicted that groundwater cleanup goals are not likely to be reached in the intermediate and lower groundwater in less than 200 years by any method. The cleanup goals are **MCLs**.
Groundwater Use Restrictions	Groundwater use restrictions must be in place until the **MCLs** are attained. Groundwater use restrictions will be required for the source areas and for off-site areas. Groundwater use restrictions would include the placement of an Environmental Notice to the deeds for properties within the current boundary of the contamination. The entire area where the use restriction would be placed has public drinking water available.

Lagoon Area Selected Remedy

Remedy Component	**Explanation**
RCRA Surface Impoundment Closure	Continental Steel Corporation's Interim **RCRA** permit established guidelines for closure of the surface impoundments. **RCRA** guidelines require an impermeable cap, post-closure monitoring, and post-closure care. Waivers from some of these guidelines are anticipated because this material: • Would be solidified to increase its compressive strength; and • Does not leach at levels above **MCLs** based upon treatability testing results from the **EPA** START laboratory. Since this area is located within the 100-year floodplain of Wildcat Creek, compensatory floodwater storage would be required.
Excavate Contaminated Solids and Consolidate On-Site	Closure of the lagoons in-place would be designed to provide a structurally sound base upon which to construct an on-site Corrective Action Management Unit (**CAMU**) for excavated materials from all **CSSS** source areas. Lagoon sludge would first be consolidated the within the **CAMU** footprint. The majority of the **PAH, PCB**, and metals-contaminated solids are within the surface impoundments. **(See Figure A-3)** This 5 to 10 feet of solidified sludge would be the base layer for the **CAMU**. Contaminated solids outside the lagoon impoundments would be excavated and disposed in the **CAMU**. This material includes waste piles, elevated **VOC** solids, and contaminated solids. The corridor adjacent to Wildcat Creek has elevated contaminant concentrations. Drums, debris and fill material were noted in this area. These areas would be excavated to depths of two to four feet and disposed in the **CAMU**. Part of the sludge removal would result in the penetration of the Wildcat Creek floodplain by approximately four feet. Compensatory storage depressions would be constructed in these areas where sludge was excavated, which would minimize the impact of a 100-year flood event on the **CAMU**. Damage control measures would be incorporated to minimize impacts of a 100-year flood event. The design would be based on characterization of the waste materials according to **RCRA** and/or **TSCA** requirements. Requirements for the construction of a **CAMU** in a 100-year floodplain will be observed.
Collect and Contain Shallow Groundwater with Expanded Interception Trench System and Dispose Off-Site	A groundwater interceptor trench will collect **VOC**-contaminated shallow groundwater. The trench would be about 45 feet in depth (to the bottom of the shallow water-bearing zone) in a "U"-shape around the downgradient boundary of the **VOC** groundwater plume. The trench would be about 3,000 feet in length, with six collection locations. An interior bisecting trench installed in an east-west direction would provide for more aggressive groundwater collection. A total flow rate of about 35 to 40 gallons per minute (**gpm)** would be expected. The modeling results for the trench system show that cleanup goals or **MCLs** for shallow groundwater may be reached in 3 to 6 years. However, residual **DNAPL** and other **VOC** sources may affect the system. Source area shallow groundwater collection systems may need to operate up to 30 years. Collected groundwater would be pumped via a buried pipeline directly to the city sewer. There the contaminated groundwater would be mixed with sewage, and exempt from hazardous waste disposal requirements. Sewer capacity limitations may necessitate short-term pump station shutdown during storm events.
Deed/Groundwater Use Restrictions	Groundwater use restrictions would be required both on-site and off-site until **MCLs** are reached. Groundwater would be monitored according to **RCRA** post closure groundwater monitoring requirements. Additional monitoring wells would be installed.

Wildcat and Kokomo Creeks Selected Remedy

Remedy Component	**Explanation**
Excavate Contaminated Creek Sediment and Consolidate in On-Site CAMU Landfill	Removal of the contaminated sediment from two miles of the creeks. The construction activities for this alternative will be performed consistent with requirements for wetlands. To control the resuspension of sediment within the water column, turbidity control barriers would need to be incorporated into the sediment removal process as appropriate. Excavation could occur through wet dredging methods, or in the dry with conventional earth moving equipment. Dredging methods would include mechanical (i.e., clamshell bucket, draglines) or hydraulic methods (i.e., suction dredge, auger dredge). Mechanical methods would disturb the sediment more than hydraulic methods. Hydraulic methods would remove large quantities of water along with the sediment and would require settling basins to allow the sediment to settle out. The water may require treatment prior to discharge into the creeks or to an off-site treatment facility or wastewater treatment facility (**WWTP**). The removed material would be dewatered per **RCRA** requirements and placed in the **CAMU**. The coarse grained material can be gravity dewatered. It may be necessary to dewater the fine-grained sediment and/or improve the compressive strength of the sediment through solidification. Once the material is suitable for landfilling, it would be placed in the **CAMU**. Up to 51,000 cubic yards of material would require landfilling (based on dewatering of 61,000 cu. yds. of the in-place sediment). Since the remedy would remove the contaminated sediment from the creeks, no future sampling of surface water or sediment would be required beyond regularly scheduled monitoring that is performed by the **IDEM** Office of Water Quality. **IDEM** performs periodic ambient water quality assessments which include surface water and biota sampling. Information from those assessments will demonstrate the effect of the remedy and will determine when the existing fish consumption advisory may be reduced or eliminated. No restrictions would be required for the creeks and there would be no future impacts to the aquatic habitat.

Markland Quarry Selected Remedy

Remedy Component	**Explanation**
Cover Contaminated Solids with Common Soil	The 1.28 million cubic yards of fill within the quarry would remain in-place with a cover consisting of a warning barrier and two feet of common soil. This provides a warning in the event of future excavation and eliminates direct contact with contaminated media. The cover would be graded and grassed to facilitate drainage and minimize erosion.
Dispose of Quarry Sediment in Lagoon Area CAMU	Sediment from the pond would be dewatered; solidified as necessary; treated off-site if necessary for **VOCs**, **SVOCs**, metals and **PCBs**; and disposed in the **CAMU**.
Contain & Collect Shallow Groundwater & Dispose at WWTP	Source area shallow groundwater would be collected along the west and north boundaries of the site. The water would be treated at the **WWTP** if contaminant levels are within pretreatment requirements. The water would be pumped directly via a pipeline to the city sewer. There the groundwater would be mixed with sewage, and exempt from hazardous waste disposal requirements. Sewer capacity limitations may necessitate short-term shut down of the extraction pumps during storm events. Source area shallow groundwater collection may need to continue up to 30 years. Shallow groundwater collection in the immediate vicinity of the Quarry would also be collected. Data indicate that shallow groundwater contamination is decreasing because of biodegradation and downward migration. Through active collection, groundwater modeling predicts that cleanup goals or **MCLs** for shallow groundwater may be reached in 15 to 20 years.
Excavate Contaminated Sediment from Quarry Pond	The sediment in the pond would be excavated using hydraulic dredging equipment.
Backfill Quarry Pond with alternative fill material	The pond would be backfilled with appropriate material.
Deed and Groundwater Use Restrictions	Deed and groundwater use restrictions will restrict site access and use of contaminated groundwater. Groundwater will be monitored quarterly for two years, semiannually for the next two years, and then annually until cleanup goals are attained. Monitoring wells would be installed in and around the Markland Avenue Quarry. Five clusters of three wells each would be installed with screened intervals across each water-bearing zone (shallow, intermediate, and lower). A sample of effluent from the groundwater collection system would be obtained for each sampling round.

Main Plant Selected Remedy

Remedy Component	Explanation
Excavate PCB Solids along Kokomo Creek and Dispose On-Site	PCB contaminated soils along Kokomo Creek would be excavated and transported to the **CAMU**. Excavated areas would be filled with clean soil. Soil excavated for site grading could be used as fill if there was no leaching potential or, if necessary, disposed in the **CAMU**.
Install Common Soil Cover	A two-foot soil cover would prevent direct contact and would be graded and seeded to promote runoff and reduce erosion and infiltration. Prior to placement of the soil cover, the Main Plant property would be graded and a warning barrier (i.e., orange snow fencing) installed to provide a warning mechanism in the event of future excavation, identifying the presence of contaminated materials.
Collect & Contain Shallow Groundwater and Dispose Off-Site	Contaminated shallow groundwater would be collected via a trench collection system installed along the Main Plant western boundary adjacent to Park Avenue and Wildcat Creek. The trench would be installed to a depth of about 30 feet and remove groundwater at a rate of 10-15 gpm. The water would be treated at the WWTP provided contaminant levels are within pretreatment requirements. Collected shallow groundwater would be pumped via a buried pipeline directly to the city sewer. There the contaminated shallow groundwater would be mixed with sewage, and exempt from hazardous waste disposal requirements. The groundwater model predicts shallow groundwater outside the source areas may reach cleanup goals in 15 years, but source area shallow groundwater collection systems may need to continue operating up to 30 years. Groundwater would be monitored until cleanup goals are attained. Additional monitoring wells would be installed in and around the Main Plant area. Two would be screened within the shallow water-bearing zone, eight screened within the intermediate water-bearing zone, and eight screened within the lower water-bearing zone. In addition, samples would be collected from the interceptor trench effluent.
Elevated VOC Solids Removal and On-Site Disposal	**VOC** contaminated solids along Wildcat Creek would be excavated and transported to the **CAMU** for disposal. A total **VOC** concentration greater than 1 **mg/kg** concentration was selected as the cleanup goal for **VOCs** in contaminated solids because the fate and transport analysis showed that a **VOC** soil concentration of 1 **mg/kg** in solid media will leach at **MCLs** into groundwater.
Deed and Groundwater Use Restrictions	Deed and groundwater use restrictions will restrict site access and the use of contaminated groundwater. Groundwater will be monitored quarterly for two years, semiannually for the next two years, and annually thereafter until compliance with cleanup goals is attained.

Slag Processing Area Selected Remedy

Remedy Component	**Explanation**
Regrade Slag Pile to Level Site	Slag piles could be spread evenly across the relatively flat surface area of the site. Due to the large volume, estimates predict that regrading would raise the surface elevation over the nine acres by more than six feet on average (including the cap). This might hamper future development of the property. The slag may be used as backfill in other areas of the **CSSS** according to regulatory guidelines.
Install Protective Common Soil Cover Over Contaminated Solids	The slag does not leach constituents at concentrations above **MCLs**. Therefore, the only health issue is direct contact exposure for metals. A cover consisting of two feet of common fill and topsoil would be placed across the entire Slag Processing Area. Prior to placement of the soil cover, a warning barrier (i.e., orange snow fencing) would be installed. This provides a warning in the event of future excavation. The topsoil surface would be seeded to minimize erosion.
Deed Restrictions	Deed restrictions would be necessary to minimize potential exposure to the remaining slag under the cover. These restrictions would call for special procedures during future construction. Groundwater contamination beneath and extending beyond the Slag Processing Area originates from an off-site source. Groundwater beneath the Slag Processing Area will be addressed in remediation for site-wide groundwater.
Stabilize Creek Bank	Erosion control (rip-rap and filter fabric) would be installed along Wildcat Creek to minimize the potential for slag entering the creek.

VII. Support Agency Comments

EPA concurs with these changes in the selected remedy.

VIII. Affirmation of Statutory Determinations

Considering the new information that has been developed and the changes that have been made to the selected remedy; **IDEM** and **EPA** believe that the remedy remains protective of human health and the environment, complies with Federal and State requirements that are applicable or relevant and appropriate to this remedial action, and is cost-effective. The modified remedy satisfies the requirements of the National Contingency Plan (**NCP**) and **CERCLA** Section 121. In addition, the revised remedy utilizes permanent solutions and alternative treatment (or resource recovery) technologies to the maximum extent practicable for this site. Since waste will be left on site, Five Year Reviews to ensure protectiveness will be required.

IX. Public Participation Activities

The **AR** is available for viewing at the Kokomo/Howard County Public Library, Genealogy Section, 220 North Union Street, Kokomo; and from 8:15 a.m. until 4:45 p.m. at the IDEM Central File Room on the 12th Floor, Indiana Government Center North Building, 100 North Senate, Indianapolis.

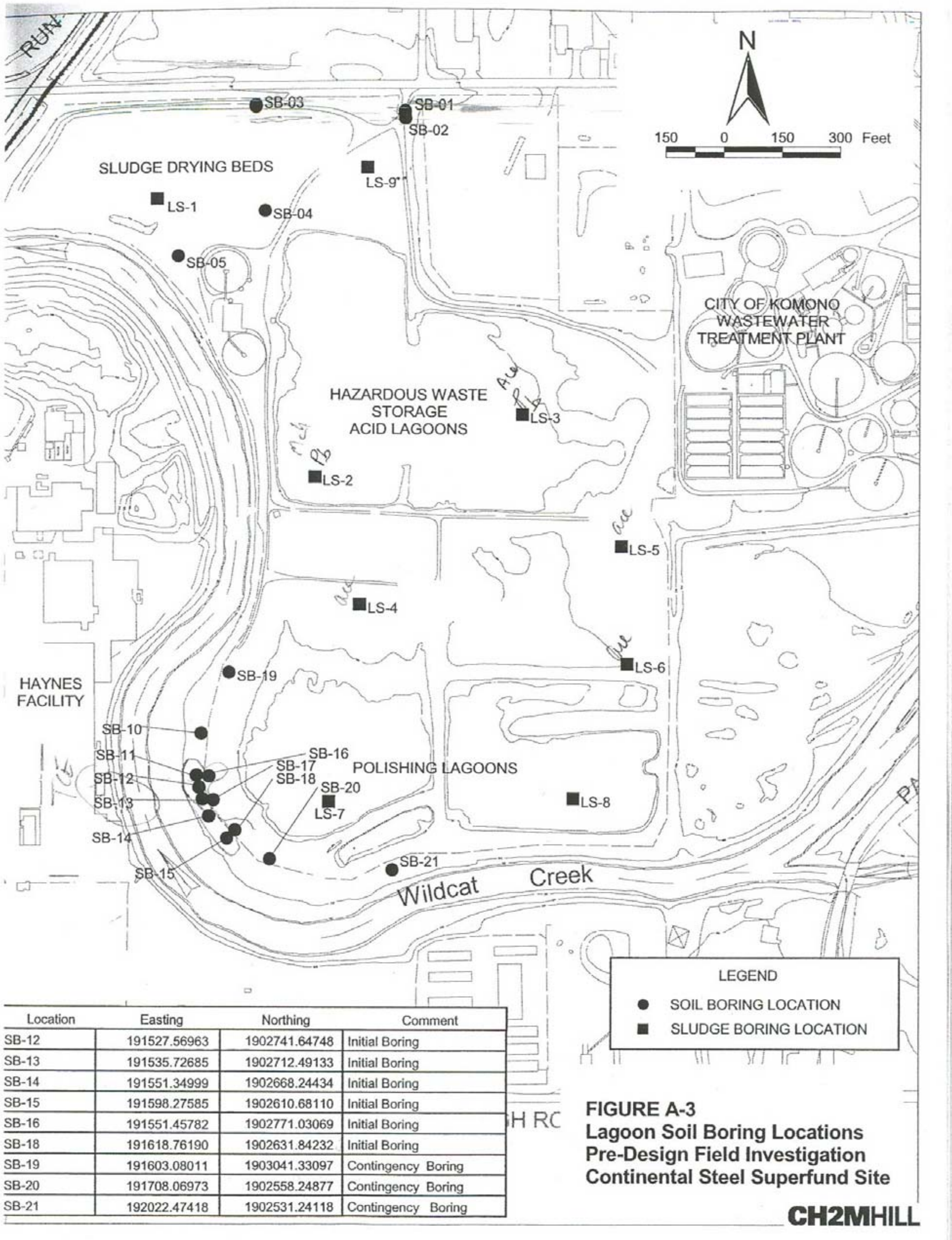
The **NCP** 300.435(c)(2)(i) requires the lead agency to publish an **ESD** when the differences in the remedial action significantly change but do not fundamentally alter the remedy selected in the **ROD** with respect to scope, performance, or cost, prior to the initiation of the remedial action. In accordance with the public participation requirements in the **NCP** this **ESD** is available for public review and a public information meeting will be held at the Ralph Neal Council Chambers, Kokomo City Hall, 100 South Union Street, from 7:00 p.m. until 9:00 p.m. on August 24, 2005. Comments will be accepted from August 15 through September 15, 2005. Fact Sheets were mailed to persons on the Continental Steel mailing list. Notice of the meeting was published in the Kokomo Tribune and the Kokomo Perspective, and on the **IDEM** web site http://www.in.gov/idem/land/pubsforms/factsheets.html.

X. Glossary of Acronyms

AR	Administrative Record
CAMU	Corrective Action Management Unit
CERCLA	Comprehensive Environmental Response Compensation and Liabilities Act
COPCs	Contaminants of Potential Concern
CSSS	Continental Steel Superfund Site
DCA	Dichloroethane
DCE	Dichloroethene

DNAPL	Dense Non Aqueous Phase Layer
EPA	U.S. Environmental Protection Agency
ERC	Environmental Restrictive Covenant
ESD	Explanation of Significant Differences
FS	Feasibilty Study
gpm	Gallons Per Minute
HSVE	Heated Soil Vapor Extraction
IC	Institutional Control
IC13	Indiana Code 13
IDEM	Indiana Department Management
ISDH	Indiana State Department of Health
MCLs	Maximum Contaminant Levels
mg/kg	Milligrams per kilogram
NCP	National Contingency Plan
NPL	National Priorities List
PAHs	Poly Aromatic Hydrocarbons
PCB	Poly Chlorinated Biphenyls
ppm	Parts Per Million
RA	Remedial Action
RCRA	Resource Conservation and Recovery Act
RI	Remedial Investigation
ROD	Record of Decision
SVOCs	Semi Volatile Organic Compounds
TCA	Trichloroethane
TCE	Trichloroethylene
TI	Technical Impracticability
TSCA	Toxic Substances Control Act
VOCs	Volatile Organic Compounds
WWTP	Waste Water Treatment Plant
ug/l	Micrograms Per Liter

XI. Tables and Figures



Location	Easting	Northing	Comment
SB-12	191527.56963	1902741.64748	Initial Boring
SB-13	191535.72685	1902712.49133	Initial Boring
SB-14	191551.34999	1902668.24434	Initial Boring
SB-15	191598.27585	1902610.68110	Initial Boring
SB-16	191551.45782	1902771.03069	Initial Boring
SB-18	191618.76190	1902631.84232	Initial Boring
SB-19	191603.08011	1903041.33097	Contingency Boring
SB-20	191708.06973	1902558.24877	Contingency Boring
SB-21	192022.47418	1902531.24118	Contingency Boring

Figure A-3. Soil Boring Locations. *From document entitled <u>Remedial Design Criteria report Continental Steel Superfund Site, Kokomo, Indiana January 2,</u> prepared for EPA by CH2M HILL*

VOC Soil Boring Data Highest Detections Per Boring in Parts Per Billion

Boring	TCE	Acetone	2-Hexanone	4-Methyl-2-Pentanone	2-Butanone	Methylene Chloride	Cis-1,2 Dichloro propene	Cis-1,2 Dichloro ethene	Isopropyl benzene	Dibromo chloro methane
SB001	52									
SB003	12							79		
SB010	5000								1600	
SB011	4100									
SB012	15000									19
SB013	85000					39000				
SB014	2800							30		
SB015	22000									
SB016	42000									
SB017	3700				12					
SB018	3800	46			12					
SB019	120									

VOC TCLP/SPLP Sludge Data Highest Detections Per Boring in Parts Per Billion

Boring	TCE	Acetone	2-Hexanone	4-Methyl-2-Pentanone	2-Butanone	Methylene Chloride	Cis-1,2 Dichloro propene	Cis-1,2 Dichloro ethene	Isopropyl benzene	Dibromo chloro methane
LS001						10		10		
LS002				410		89		89		
LS003		620	49		160	43		43		
LS004		350								
LS005		190	15	170	42		46		46	19
LS006		460								
LS007		150	35							
LS008										

TCLP/SPLP Sludge Data Highest Detections Per Boring in Parts Per Billion

	Metals and Semivolatiles				Volatiles
Boring	Beryllium	Lead	Arsenic		TCE
LS001	2.7	10.7			
LS002	3.8	2100			
LS003	3.7	12800			
LS004	4.4				
LS005	3.9	110			
LS006	2.9	44.9			
LS007	3.1				
LS008	3.1	61.6			
SD021		17	2.5		50
SD024					16
SD027		16.4	4.7		120

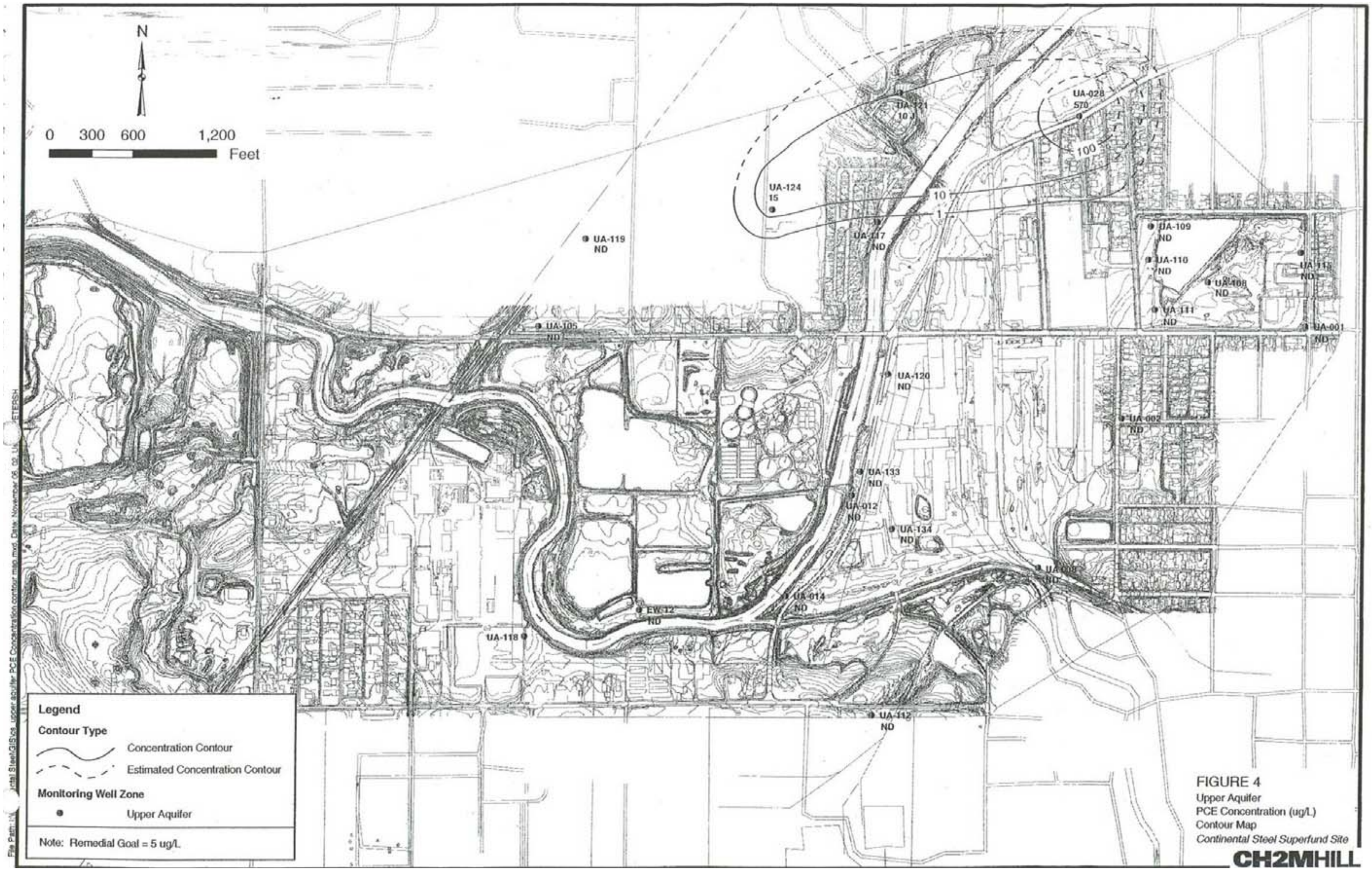


Figure 4, Upper Aquifer PCE Concentrations. *From Technical Memorandum entitled* *<u>Continental Steel Superfund Site Contract 5 – Groundwater, Groundwater Flow and Quality Conditions</u>, prepared for EPA by CH2M HILL on February 7, 2003.*

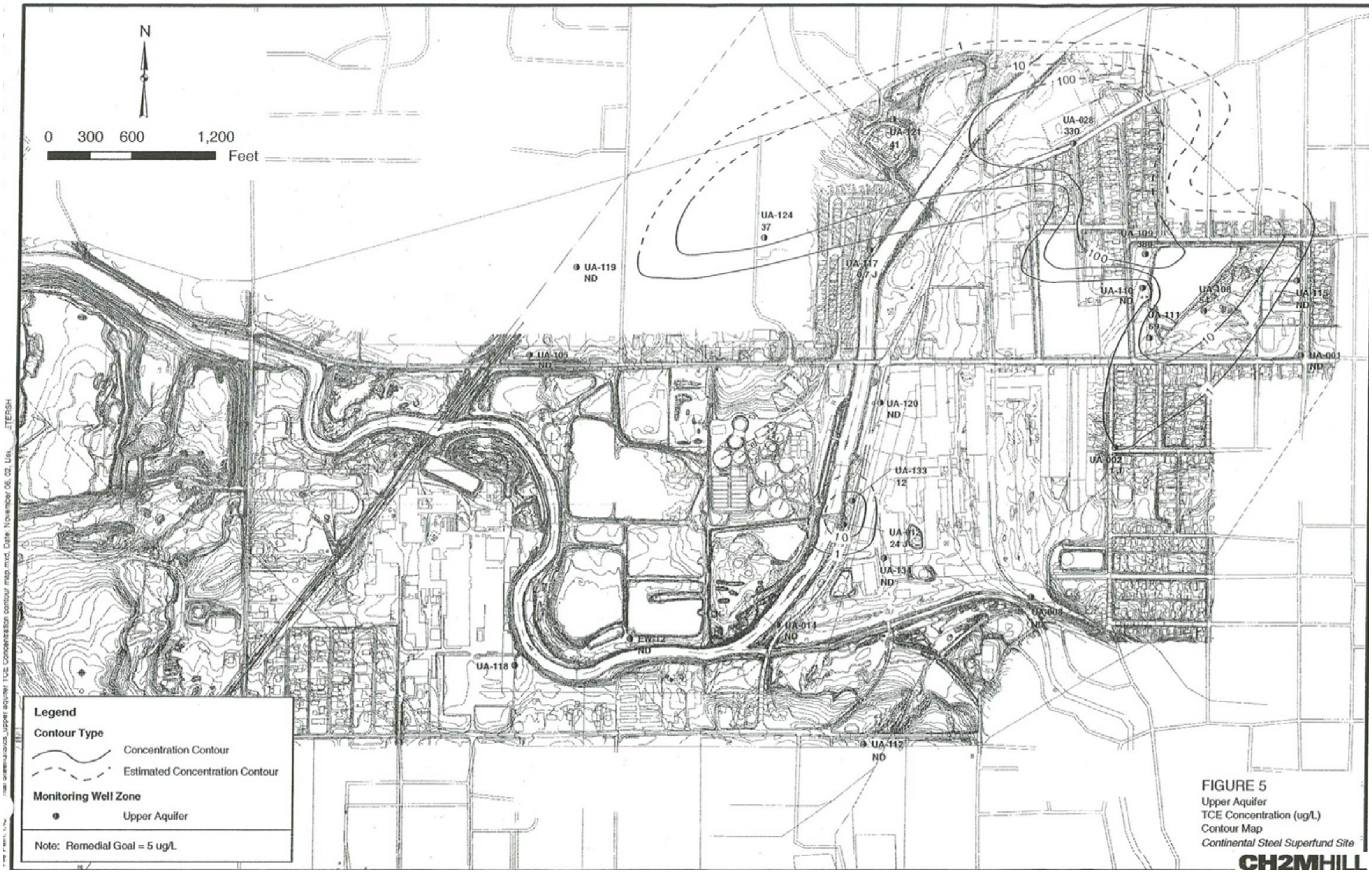


Figure 5, Upper Aquifer TCE Concentrations. *From Technical Memorandum entitled* *Continental Steel Superfund Site Contract 5 – Groundwater, Groundwater Flow and Quality Conditions**, prepared for EPA by CH2M HILL on February 7, 2003.*

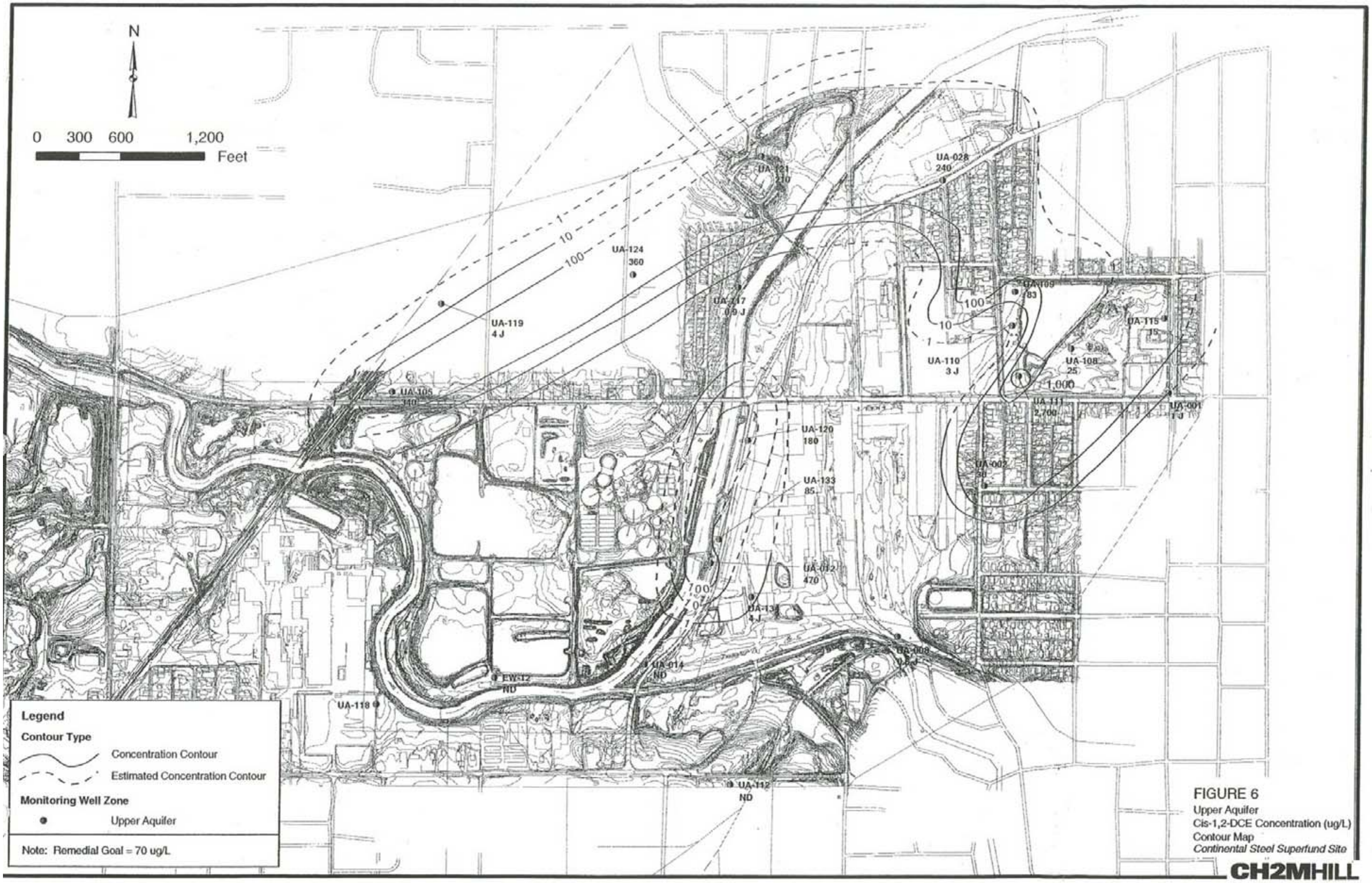


Figure 6 Upper Aquifer Cis-1.2-DCE Concentrations, *From Technical Memorandum entitled Continental Steel Superfund Site Contract 5 – Groundwater, Groundwater Flow and Quality Conditions, prepared for EPA by CH2M HILL on February 7, 2003.*

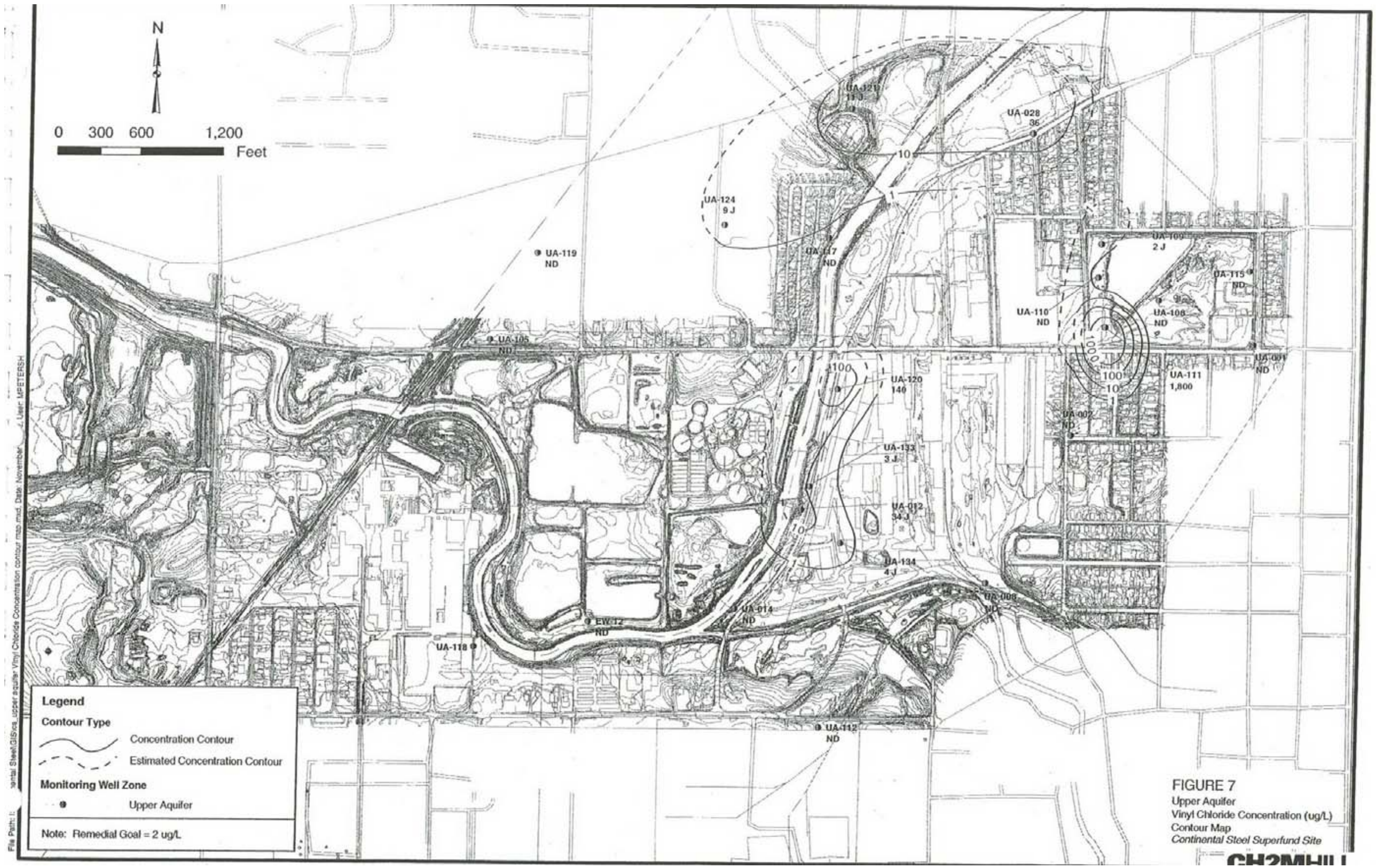


Figure 7 Upper Aquifer Vinyl Chloride Concentrations, *From Technical Memorandum entitled* *Continental Steel Superfund Site Contract 5 – Groundwater, Groundwater Flow and Quality Conditions*, *prepared for EPA by CH2M HILL on February 7, 2003.*

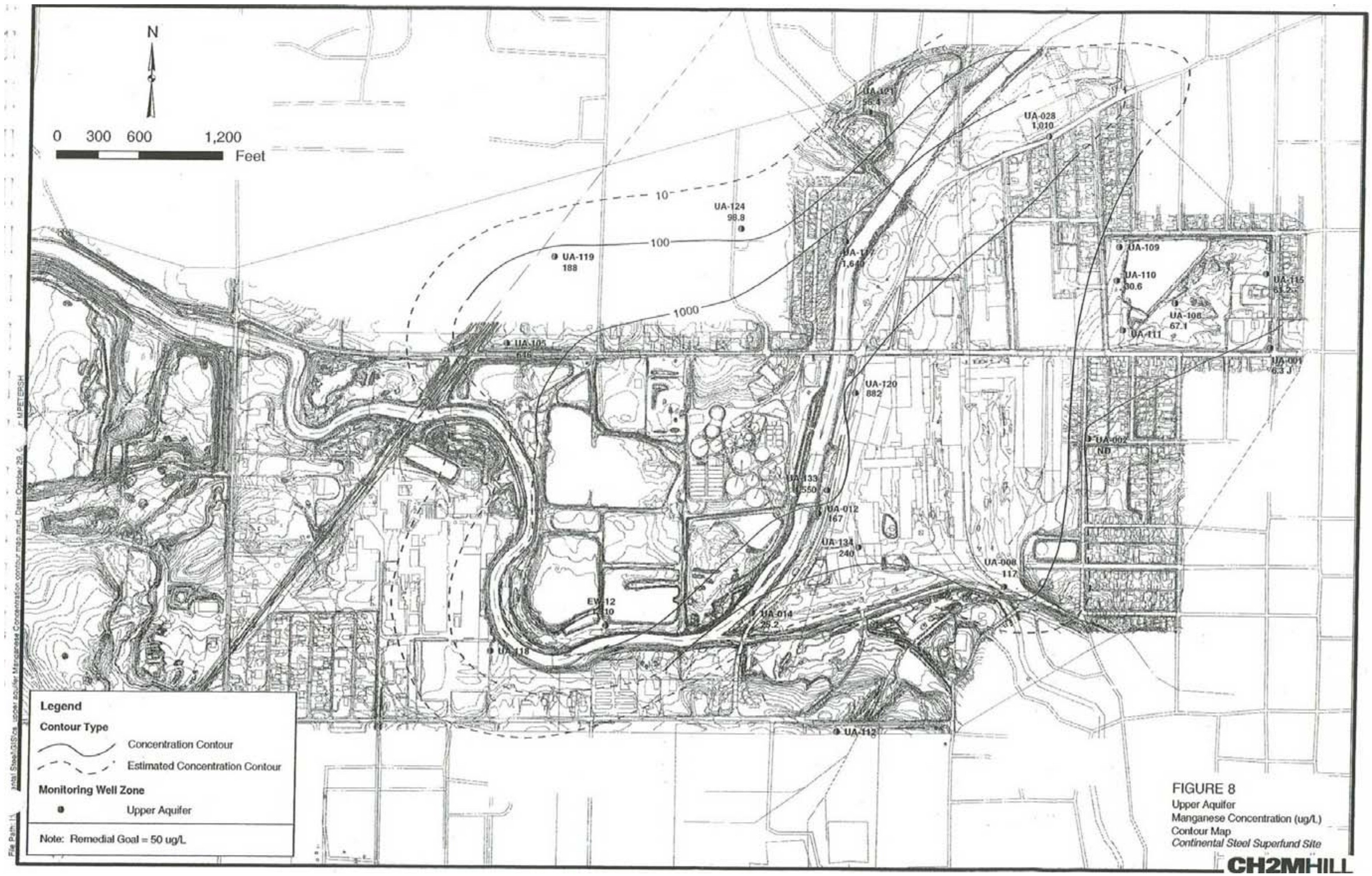


Figure 8 Upper Aquifer Manganese Concentrations, *From Technical Memorandum entitled* *Continental Steel Superfund Site Contract 5 – Groundwater, Groundwater Flow and Quality Conditions**, prepared for EPA by CH2M HILL on February 7, 2003.*